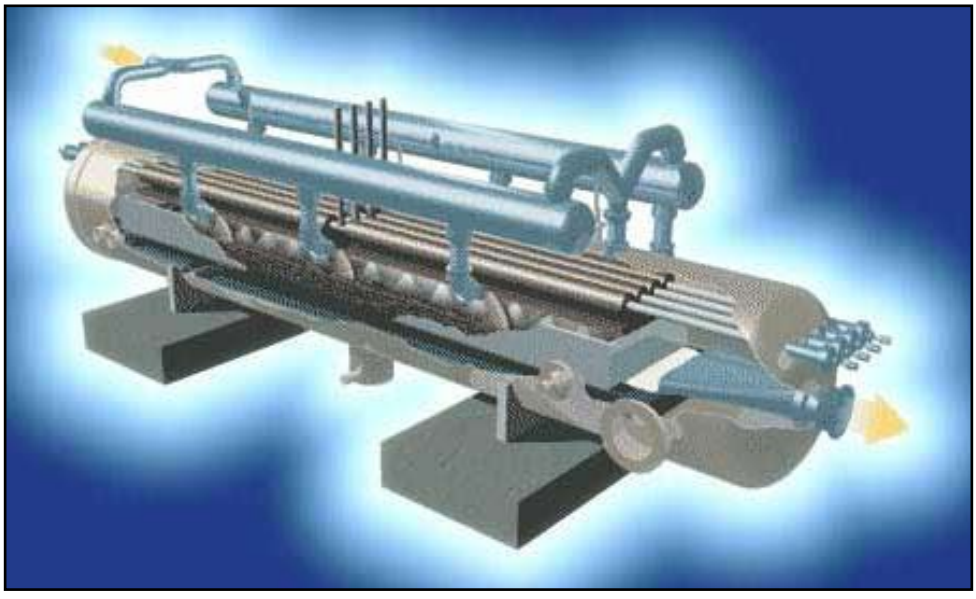
Steam Cycle Washer for Unbleached Pulp

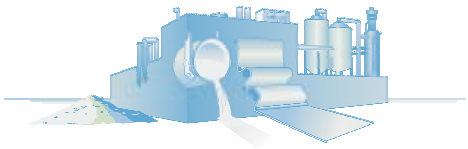
Innovative Pulp Washer Will Enhance Industry Profitability by Reducing Energy Costs, Increasing Product Quality, and Reducing Environmental Impact

In recent years, the U.S. pulp and paper industry has been faced with environmental, resource, and economic problems causing a loss in jobs and even the closing of pulp mills. Because of this, the industry lacks the funds to invest in and develop cost-effective technology that could raise profitability and bring mills up to higher environmental standards. As a result, the pulp industry has been slow in making technical improvements. In fact, the most significant new pulp washing technology development was invented 25 years ago and the current U.S. pulp washing equipment has an average age of 45 years.

Pulp washing is used in the pulping and bleaching process to remove the cooking chemicals and extracted lignin from the pulp. This project will demonstrate a new, commercial scale Steam Cycle (SC) Washer at the Port Townsend Paper Mill. The SC Washer is an innovative, steam-pressurized, high consistency pulp washer that promises substantial energy and environmental-related benefits. The feasibility of this new washer concept has been demonstrated through extensive pilot plant evaluations. Overall, the technology will allow pulp mills and the industry to increase profitability by substantially reducing energy consumption, improving product quality, and ensuring that environmental compliance exceeds current regulations.



Steam Cycle Washer.



Benefits for Our Industry and Our Nation

The SC Washer could enhance pulp industry profitability by enabling most pulp mills to achieve up to (1) a 21% decrease in electrical power consumption for unbleached pulp production, with potential savings of 14 trillion Btu (British thermal units) per year within 10 years; (2) a 50% reduction in evaporator load, which could possibly reduce fuel-consumption by 40% for unbleached pulp production, with potential savings of 81 trillion Btu/year within 10 years; and (3) a 45% decrease in plant effluent and freshwater usage, reducing environmental impact to water resources.

Applications in Our Nation's Industry

The SC Washer installation in this project is a brown stock washer demonstration; however, the technology can also be applied to bleaching processes.

Project Partners

Port Townsend Paper Corporation
Port Townsend, WA

21st Century Pulp & Paper, LLC
Bellingham, WA

Idaho National Laboratory (INL)
Idaho Falls, ID

Project Description

The goal of this project is to demonstrate a commercially viable steam cycle washer to enhance the pulp production process by decreasing energy consumption, reducing environmental impacts, and increasing product quality.

Technology Description

The SC Washer is designed to de-water and wash wood pulp using counter-current washing, steam, and high-differential pressure. The entire operation takes place within a pressure vessel that can be pressurized to as high as 8 bars (the pressure is maintained with 8-bar steam). The design uses 70-75% less water than conventional washers because it allows the pulp mat to be washed at a high consistency of 28-32%, resulting in less energy used for heating and pumping.

Pathways and Milestones

The objectives of this project will be achieved through (1) design and engineering specifications development; (2) fabrication and shop testing; (3) delivery and field installation; (4) mechanical and process testing; and (5) operational testing.

Commercialization

Marketing of the washer will be performed by 21st Century Pulp & Paper, LLC. During the development and technology validation stages, the U.S. pulp mills will be provided with a comprehensive analysis of the SC Washer's performance, including an evaluation of projected savings. The Port Townsend Paper Corporation's pulp mill in Port Townsend, WA has been selected as the host site for conducting the demonstration of the SC Washer.

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